REMARKS

In the Office Action mailed August 4, 2008, the Examiner (1) rejected claims 24, 34, 35, 37, 43, and 45 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,658,033 (Andersson) and (2) rejected claims 25-33, 36, 38-42, and 44 under 35 U.S.C. § 103(a) as being unpatentable over Andersson in view of U.S. Patent No. 4,835,779 (Liou).

1.   Status of the Claims

Currently pending are claims 24-45, of which claims 24, 35, 37, 43, 44, and 45 are independent, and the remainder are dependent.

2.   Response to 35 U.S.C. § 103(a) Rejections over Andersson

As noted above, the Examiner rejected claims 24, 34, 35, 37, 43, and 45 under 35 U.S.C. § 103(a) as being unpatentable over Andersson. Applicant respectfully submits that these claims are not unpatentable over Andersson.

A.   Claims 24-34, 37-42, and 44

At the least, Andersson does not teach or suggest increasing the second controlled current/voltage by a step before obtaining a second set of measurement values by decreasing the first control current/voltage in a negative direction, as disclosed by claim 24.

Claim 24 discloses a method of obtaining a measurement plane from a multi-section tunable laser diode. The method comprises (a) obtaining a first set of measurement values for an output of the laser diode by increasing a first current/voltage through a range of values in a positive direction; (b) increasing a second control current/voltage by a step; (c) obtaining a second set of measurement values for the output of the laser diode by decreasing the first control current/voltage through a range of values in a negative direction; (d) increasing a second control current/voltage by a step;

(e) repeating steps (a) - (d) until a sufficient range of the second control current/voltage has been used; and (f) identifying, in a resultant data set, regions of hysteresis.

In rejecting claim 24, the Examiner admitted that "Anderson does not disclose: increasing a second control current/voltage by a step after the positive sweep and increasing a second control current/voltage by a step after a negative sweep." Office Action, p. 3. The Examiner then argued that Andersson's disclosure on col. 3, lines 46-64 supporting Figure 5 led to "a simpler way of obtaining an output graph for the laser device." Id. The Examiner then argued that "[i]t would have been obvious to one having ordinary skill in the art to modify the laser device of Anderson [to reach elements (a)-(e) of claim 24] since this is a simpler way of obtaining an output graph for the laser device." Id.

Figure 5 of Andersson shows "the coupler current as a function of the reflector current for a given phase current". Andersson, col. 3, lines 46-47. Figure 5 is a 3-dimensional graph, showing reflector current R on an R-axis, coupler current C on a C-axis, and "[t]he Z-axis shows the hysteresis value, i.e. the absolute value of the power difference within each hysteresis region 18." Andersson, col. 3, lines 48-50. As Andersson described with respect to Figure 4,"the difference in power is calculated with one and the same reflector current R, but in said different sweep directions." Andersson, col. 3, lines 26-28 and lines 50-51 (tying Figures 4 and 5 together). As described in Figure 4, the areas labeled #17 are the magnitude of hysteresis, which is measured by tuning one current up and down while holding the second current constant, and taking the difference between a lower portion and an upper portion of a power curve. See Figure 4, #15 (upper portion), #16 (lower portion), #17 (indicating hysteresis magnitudes).

To obtain the hysteresis regions (circles) shown in Figure 5, Andersson indicates that "the power output of the laser in different planes is measured each with a constant phase current PH but

with varying coupler current C and reflector current R, where the reflector current R is the inner variable." Andersson, col. 3, lines 41-45. Thus, Andersson holds coupler current C constant and sweeps reflector current R up and down.

The method of claim 24 has several advantages over the disclosure of Andersson. First, no current sweep is required to be duplicated as indicated in claim 24, unlike the disclosure of Andersson. The method of claim 24 minimizes the magnitude of current changes, thus minimizing changes in temperature. *See* Specification, p. 10, lines 14-19 and p. 17, lines 10-17. As indicated in our previous response, Andersson is unable to capture discontinuities other than hysteresis, such as cavity mode jumps and other such effects. Further, the measurement may be less susceptible to noise compared to the teachings of Andersson.

Therefore, it is respectfully submitted that it would not be obvious to a person skilled in the art to modify Andersson's disclosed technique in order to provide a method resulting in the above mentioned advantages without the exercise of significant inventive input. There is no suggestion in Andersson to make the modifications proposed by the Examiner. Applicant submits that claim 24 is non-obvious over Andersson as it provides at least the advantages discussed above. For at least the foregoing reasons, Applicant submits that claim 24 is allowable over Andersson does not render claim 24 obvious.

Further, for at least the same reasons for claim 24, Applicant submits that claims 37 and 44 are is allowable over Andersson as Andersson does not render claims 37 and 44 obvious. Claim 37 recites a means for increasing a second control current by a step after obtaining the first set of measurement values. Similarly, claim 44 recites an increment function for increasing a second control current by a step after obtaining the first set of measurement values but before obtaining the

second set of measurement values. Therefore, for at least the reasons and advantages presented above for claim 24, claims 37 and 44 are not rendered obvious by Andersson.

In addition, claims 25-34 depend from claim 24, and claims 38-42 depend from claim 37. Therefore, Applicant submits that claims 25-34 and 38-42 are allowable over Andersson for at least the reason that each of these claims ultimately depends from an allowable base claim.

B.   Claims 35-36, 43, and 45

At the least, Andersson does not teach or suggest obtaining a first set of measurement values for the output of the laser diode by increasing a first control current through a range of values in a positive direction and decreasing a second control current in a negative direction at the same time, as disclosed by claim 35.

Claim 35 discloses a method of obtaining a measurement plane from a multi-section tunable laser. The method comprises: (a) obtaining a first set of measurement values for the output of the laser diode by increasing a first control current through a range of values in a positive direction and decreasing a second control current in a negative direction at the same time; (b) increasing one of the first or second control currents by a step; (c) obtaining a second set of measurement values for the output of the laser diode by increasing the second control current through a range of values in a positive direction and decreasing a first control current in a negative direction at the same time; and (d) repeating steps (a) - (c) until a sufficient range of the first and the second control current has been used, wherein total control currents to the laser are changing at a continuous rate.

Figure 5 of Andersson shows "the coupler current as a function of the reflector current for a given phase current". Andersson, col. 3, lines 46-47. Figure 5 is a 3-dimensional graph, showing reflector current R on an R-axis, coupler current C on a C-axis, and "[t]he Z-axis shows the hysteresis value, i.e. the absolute value of the power difference within each hysteresis region 18." Andersson,

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col. 3, lines 48-50. As Andersson described with respect to Figure 4,"the difference in power is calculated with one and the same reflector current R, but in said different sweep directions." Andersson, col. 3, lines 26-28 and lines 50-51 (tying Figures 4 and 5 together) and Figure 4, #17 and #17 (indicating hysteresis magnitudes).

To obtain the hysteresis regions (circles) shown in Figure 5, Andersson indicates that "the power output of the laser in different planes is measured each with a constant phase current PH but with varying coupler current C and reflector current R, where the reflector current R is the inner variable." Andersson, col. 3, lines 41-45. Thus, Andersson holds coupler current C constant and sweeps reflector current R up and down.

To reach claim 35, the principle of operation of Andersson argued in the Office Action would have to be impermissibly changed as indicated in M.P.E.P. § 2143.02. "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." M.P.E.P. § 2143.02(VI).   *See also* M.P.E.P. § 2145(III). As indicated above, the principle of operation for Andersson is that the second control current is not increased by a step until after an up/down sweep of the first control current is complete.

At a minimum, Andersson does not disclose or suggest increasing the first current while the second current is decreased <u>at the same time</u> as recited in claim 35. Further, Andersson uses a different principle of operation – increasing a second control current only after completing a sweep rather than increasing the first current while the second current is decreased at the same time as recited in claim 35. Applicant therefore submits that the modification of Andersson in the Office Action in rejecting claim 35 changes Andersson's principle of operation and thus is an impermissible

modification. Therefore, Applicant submits that Andersson does not render claim 35 *prima facie* obvious and thus claim 35 is allowable over the cited art.

Further, for at least the same reasons that Andersson does not render claim 35 *prima facie* obvious, Applicant submits that Andersson does not render claims 43 and 45 *prima facie* obvious. Claim 43 recites a means for obtaining a first set of measurement values for an output of the laser diode by increasing a first control current through a range of values in a positive direction and decreasing a second control current in a negative direction at the same time. Similarly, claim 45 recites a current source control for obtaining a first set of measurement values for an output of the laser diode by increasing a first control current through a range of values in a positive direction and decreasing a second control current in a negative direction at the same time.

As discussed above, Andersson does not disclose or suggest increasing the first current while the second current is decreased <u>at the same time</u> as recited in claims 43 and 45. Further, the modification of Andersson in the Office Action in rejecting claim 43 and 45 is an impermissible modification. Therefore, Andersson does not render claims 43 and 45 *prima facie* obvious and thus claims 43 and 45 are allowable over Andersson.

Claim 36 depends from claim 35. It follows that Andersson does not render claim 36 obvious for at least the reason that claim 36 depends from an allowable base claim 35 and thus claim 36 is allowable over Andersson.

3. Response to the 35 U.S.C. § 103(a) Rejection of Andersson and Liou

As noted above, the Examiner rejected claims 25-33, 36, 38-42, and 44 under 35 U.S.C. § 103(a) as being unpatentable over Andersson in view of Liou. Applicants respectfully submit that the combination of Andersson and Liou does not render claims 25-33, 36, 38-42, and 44 obvious under § 103.

Liou discloses a method and apparatus for producing laser pulses at two wavelengths alternately by switching the oscillations of a distributed feedback semiconductor laser of the continuous grating type back and forth across the stop band. (Abstract) Nothing in Liou teaches or suggests (i) stepping up a second control current while in between the up-sweep and down-sweep of the first current or (ii) increasing the first current while the second current is decreased at the same time. Thus, Liou does not overcome the deficiencies of Andersson.

Therefore, Applicants submit that claims 25-33, 36, 38-42, and 44 are new, non-obvious, and allowable over the Andersson/Liou combination. Thus, for at least the reasons presented above, claims 24-45 are allowable over the cited art. Applicant respectfully requests that the Examiner withdraw the 35 U.S.C. § 103(a) rejections of claims 24-45.

4.   Conclusion

For the foregoing reasons, Applicants submit that all of the pending claims are now in condition for allowance, and thus Applicants respectfully request notice to that effect. Should the Examiner wish to discuss any aspect of this application, the Examiner is welcome to call the undersigned at (312) 913-3338.

Respectfully submitted,

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